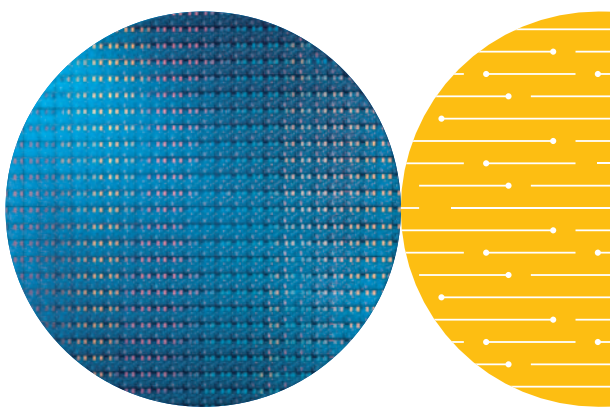
Intel® 31244 PCI-X to Serial ATA Controller

As network infrastructure continues to evolve, there is a continuing demand for accessible, highly available and manageable networked storage. Intel provides the storage building blocks that help the industry implement cost-effective solutions that meet customer demand for intelligent and highly available storage distributed anywhere in the network. Intel is building on its core competencies in silicon, middleware and I/O technologies to help the industry benefit from powerful transitions in networked storage, by leading the development of open-industry standards, including Serial ATA (SATA). The new inside-the-box disk interconnect, Serial ATA provides a series of compelling benefits including performance headroom, thin/round cabling, board real estate savings and software transparency with legacy Parallel ATA (PATA).

Intel in Communications

Product Highlights

- Four SATA ports at 1.5Gbps (150 MBps)
- Compliant with both SATA 1.0 and SATA II: Extensions to Serial ATA 1.0a specifications
- SATA II Native Command Queuing (NCQ)
- Enhanced voltage support for storage backplane applications
- Activity LED support for each drive, or one LED for the system
- PCI-X 1.0a compliant 64-bit at 133/100/66MHz bus speeds. Backward compatible with standard 32/64-bit PCI at 33MHz and 66MHz bus speeds.
- Direct Port Access (DPA mode or Master/Master) for high performance
- Dedicated DMA channel for each SATA port
- Supports Master/Slave mode for compatibility with existing OS
- Supports hot-plug SATA drives
- Optional external serial flash ROM support up to 128 KB



Product Overview

The Intel® 31244 Controller is a fully integrated state-of-the-art SATA host controller that enables storage equipment manufacturers to deliver SATA-based storage solutions now. The Intel 31244 Controller is targeted at embedded, external storage, NAS, PCI-X Host Bus Adapter cards and RAID controllers. The Intel 31244 Controller has 4 SATA ports running at 1.5 Gbps. The device is compliant with the PCI-X 1.0a specification bus operating at 64 bits at 133/100/66MHz, allowing burst data rates of up to 1064 MBps. Working in congunction with the Intel® IOP321 I/O processor, the Intel 31244 Controller provides an ideal solution for developing hardware RAID applications.

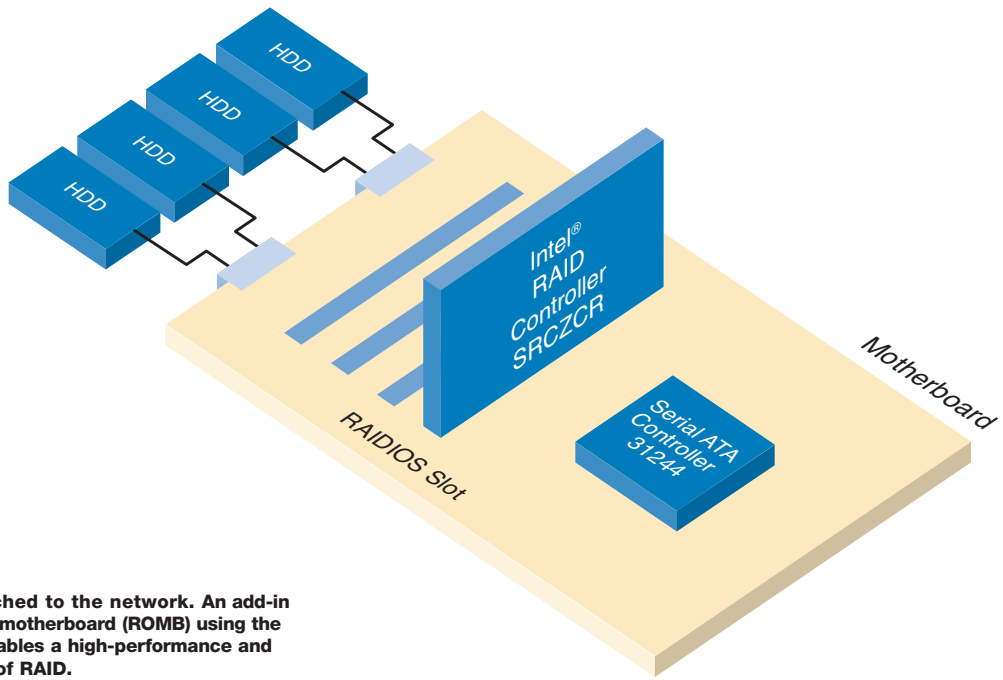
The Intel 31244 Controller is fully compatible with Parallel ATA operating system drivers and software. It can be configured in compatibility mode, mapping the PCI-X configuration space to match the x86 standard primary and secondary IDE ports. For high-performance applications such as RAID and video streaming, all four SATA ports can be configured to run in Direct Port Access Mode (DPA) where the data can be transferred from/to all four disks simultaneously. DPA utilizes PCI-X memory space accesses rather than I/O space. Memory space accesses, especially on Intel® Pentium® class host systems, are much more efficient than I/O space accesses. I/O space accesses can cause pipeline flushes and stalls. By using PCI-X memory space instead, the Intel 31244 Controller provides performance gains in excess of performance associated with current ATA technology.

The Intel 31244 Controller is compliant with both SATA 1.0 and SATA II: Extensions to Serial ATA 1.0a specifications, which make the 31244 Controller ideal for external/enterprise storage applica-tions. The key Extensions features supported include Native Command Queuing, enhanced differential voltage for SATA backplane support, and Activity LED for each SATA port to exhibit disk activity status.

The Intel 31244 Controller is cost-effective for applications that require four (or multiples of four) SATA ports. The chip comes in a small package (17 x 17 mm, 256 TE-PBGA) making it an ideal choice for embedded or motherboard implementation. Additionally, for add-in card applications, up to 128 Kbytes of firmware may be downloaded to the system from a Serial ROM interface on the controller.

System Model #1

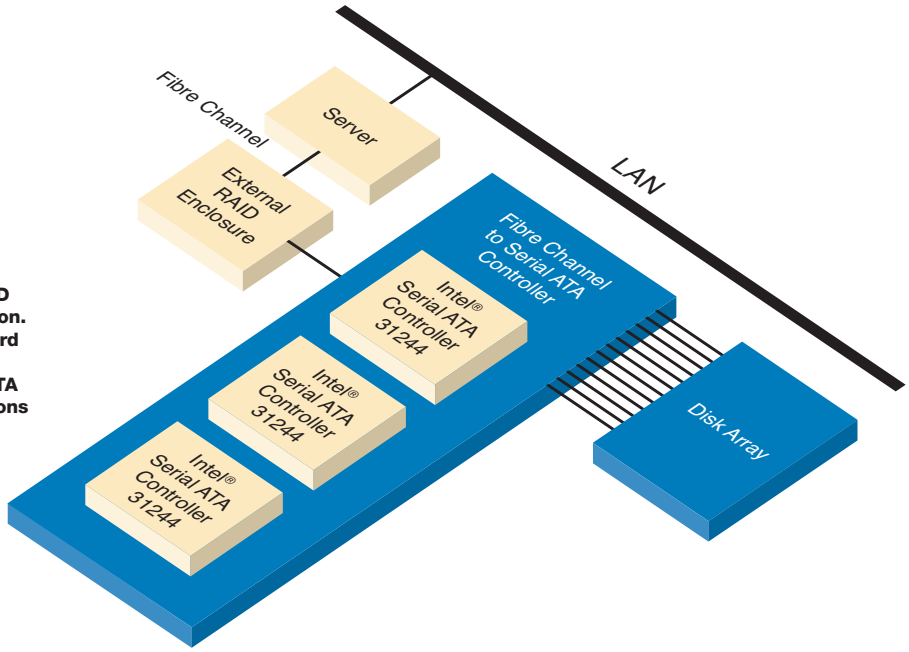
Direct Attached Storage (DAS)—motherboard



A NAS appliance is attached to the network. An add-in RAID card or RAID on the motherboard (ROMB) using the Intel® 31244 Controller enables a high-performance and low-cost implementation of RAID.

System Model #2:

External Enclosure



A server is attached to an external RAID enclosure with a Fibre Channel connection. The Fibre Channel-to-Serial ATA RAID card using the Intel® 31244 controller in the enclosure supports RAID, with Serial ATA providing dedicated-bandwidth connections to multiple hard disk drives.

Intel® 31244 Software Components

DPA Mode Drivers	Windows (2000, .Net, XP, NT) Linux (RedHat v. 7.3)
PCI Expansion ROM code	Enables boot-up capability in DPA mode
OIS and Platform agnostic base driver library source available upon request.	

Features	Benefits
PCI-X 133/100/66MHz	Provides attach to PCI-X-based systems
Legacy mode	No changes required to OS due to backward compatibility with ATA
DPA mode	Enhanced performance over ATA by allowing data transfer to all four drives simultaneously
Enhanced voltage support	Enables customers to deploy SATA in storage backplanes
Activity LED support	Enables the user to visually determine if an individual disk is active
256 TE-PBGA package (17x17mm)	Cost-effective, small package for motherboard implementation

Support Collateral/Tools

Item	Description	Order Number
Developer Manual	This document provides details of the features/ functions of the Intel® 31244 SATA Controller and provides all the register definitions for programming the Intel 31244 SATA Controller.	273603-001
Datasheet	This document provides a functional overview, package signal location, targeted electrical specifications, and bus functional waveforms.	273595-001
Design Guide	This document provides layout information and guidelines for designing platform or add-in board applications with the Intel® 31244 SATA Controller.	273651-001
Customer Reference Board	This 16 port SATA development board targets the external storage market providing translation between disk or network interconnect and SATA. The targeted interfaces are iSCSI.	IQ31244

Intel Access

Developer Web Site	http://developer.intel.com
Intel Storage Products Developer Site	http://developer.intel.com/design/storage
Intel Literature Center	http://developer.intel.com/design/litcentr 800 548-4725 7am - 7pm CST (USA and Canada)
General Information Hotline	800 628-8686 or 916 356-3104 5am - 5pm PST

For more information, visit the Intel Web site at: **http://developer.intel.com/design/storage/serialata/gd31244.htm**

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